

has sometimes so slowly increased, that I have observed the Bubble to be some hours in passing between the top and bottom.

7. Whether the appearance of the *Pike of Tenerif*, and several other high Mountains, at so much greater a distance then seems to agree with their respective heights, be not to be attributed to the *Curvature* of the visual Ray, that is made by its passing obliquely through so differing *Densities* a Medium from the top to the eye very far distant in the Horizon: For since we have already, I hope, made it very probable, that there is such an *inflection* of the Rays by the differing density of the parts of the Air; and since I have found, by several Experiments made on places comparatively not very high, and have yet found the pressure sustain'd by those parts of the Air at the top and bottom, and also their differing Expansions very considerable: Insomuch that I have found the pressure of the *Atmosphere* lighter at the top of *St. Paul's Steeple* in *London* (which is about two hundred foot high) then at the bottom by a sixtieth or fiftieth part, and the expansion at the top greater then that at the bottom by neer about so much also; for the *Mercurial Cylinder* at the bottom was about 39. inches, and at the top half an inch lower; the Air also included in the Weather-glass, that at the bottom fill'd only 155. spaces, at the top fill'd 158. though the heat at the top and bottom was found exactly the same with a scald'd *Thermometer*: I think it very rational to suppose, that the greatest *Curvature* of the Rays is made nearest the Earth, and that the inflection of the Rays, above 3. or 4. miles upwards, is very inconsiderable, and therefore that by this means such calculations of the height of Mountains, as are made from the distance they are visible in the Horizon, from the supposal that that Ray is a straight Line (that from the top of the Mountain is, as 'twere, a Tangent to the Horizon whence it is seen) which really is a *Curve*, is very erroneous. Whence, I suppose, proceeds the reason of the exceedingly differing Opinions and Assertions of several Authors, about the height of several very high Hills.

8. Whether this Inflection of the Air will not very much alter the supposed distances of the Planets, which seem to have a very great dependence upon the Hypothetical refraction or inflection of the Air, and that refraction upon the hypothetical height and density of the Air: For since (as I hope) I have here shewn the Air to be quite otherwise then has been hitherto suppos'd, by manifesting it to be, both of a vast, at least an uncertain, height, and of an unconstant and irregular density; It must necessarily follow, that its inflection must be varied accordingly: And therefore we may hence learn, upon what sure grounds all the Astronomers hitherto have built, who have calculated the distance of the Planets from their Horizontal *Parallax*; for since the Refraction and *Parallax* are so nearly ally'd, that the one cannot be known without the other, especially by any wayes that have been yet attempted, how uncertain must the *Parallax* be, when the Refraction is unknown? And how easie is it for Astronomers to assign what distance they please to the Planets, and defend them, when they have such a curious *subterfuge* as that of Refraction, wherein a very little variation will allow them liberty enough to place the Celestial Bodies at what distance they please.

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If therefore we would come to any certainty in this point, we must go other wayes to work; and as I have here examined the height and refractive property of the Air by other wayes then are usual, so must we find the *Parallax* of the Planets by wayes not yet practis'd; and to this end, I cannot imagine any better way, then the Observations of them by two persons at very far distant parts of the Earth, that lye as neer as may be under the same Meridian, or Degree of longitude, but differing as much in latitude, as there can be places conveniently found: These two persons, at certain appointed times, should (as near as could be) both at the same time, observe the way of the *Moon*, *Mars*, *Venus*, *Jupiter*, and *Saturn*, amongst the fixt Stars, with a good large *Telescope*, and making little Iconismes, or pictures, of the small fixed Stars, that appear to each of them to lye in or near the way of the Center of the Planet, and the exact measure of the apparent Diameter; from the comparing of such Observations together, we might certainly know the true distance, or *Parallax*, of the Planet. And having any one true *Parallax* of these Planets, we might very easily have the other by their apparent Diameters, which the *Telescope* likewise affords us very accurately. And thence their motions might be much better known, and their Theories more exactly regulated. And for this purpose I know not any one place more convenient for such an Observation to be made in, then in the Island of *St. Helena*, upon the Coast of *Africk*, which lyes about sixteen degrees to the Southwards of the Line, and is very near, according to the latest Geographical Maps, in the same Meridian with *London*; for though they may not perhaps lye exactly in the same, yet their Observations, being ordered according to what I shall anon shew, it will not be difficult to find the true distance of the Planet. But were they both under the same Meridian, it would be much better.

And because Observations may be much easier, and more accurately made with good *Telescopes*, then with any other Instruments, it will not, I suppose, seem impertinent to explain a little what wayes I judge most fit and convenient for that particular. Such therefore as shall be the Observators for this purpose, should be furnished with the best *Telescopes* that can be had, the longer the better and more exact will their Observations be, though they are somewhat the more difficultly manag'd. These should be fitted with a *Rete*, or divided Scale, plac'd at such a distance within the Eye-glass, that they may be distinctly seen, which should be the measures of minutes and seconds; by this Instrument each Observer should, at certain prefixt times, observe the *Moon*, or other Planet, in, or very near, the Meridian; and because it may be very difficult to find two convenient stations that will happen to be just under the same Meridian, they shall, each of them, observe the way of the Planet, both for an hour before, and an hour after, it arrive at the Meridian; and by a line, or stroke, amongst the small fixed Stars, they shall denote out the way that each of them observ'd the Center of the Planet to be mov'd in for those two hours: These Observations each of them shall repeat for many dayes together, that both it may happen, that both of them